

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Previously Presented) An ink cartridge for use with a recording apparatus which supplies ink to a recording head by application of pressurized air produced by an air pressurization pump, the ink cartridge comprising:

an outer shell member constructed at least by a first outer shell constituent member and a second outer shell constituent member, said first outer shell constituent member having an opening and having a film hermetically sealed over said opening, said second outer shell constituent member being coupled to said first outer shell constituent member to cover said film;

an ink pack of flexible material storing ink therein, the ink pack being housed within the outer shell; and

a pressure chamber defined between the outer shell member and the ink pack and adapted to receive the pressurized air produced by the air pressurization pump.

2. (Previously Presented) The ink cartridge according to claim 54, wherein the first outer shell constituent member and the second outer shell constituent member are hermetically coupled together by vibratory welding.

3. (Original) The ink cartridge according to claim 2, wherein a continuous, substantially planar weld surface is formed over the entirety of a peripheral edge of a lower case forming the first outer shell constituent member, and a continuous director is formed on a peripheral edge of a upper case forming the second outer shell constituent member to be frictionally welded upon contact with the weld surface.

4. (Original) The ink cartridge according to claim 3, wherein an upright flange section is integrally formed on the peripheral edge of a lower case forming the first outer shell constituent member, along an outer periphery of the weld surface.

5. (Previously Presented) An ink cartridge for use with a recording apparatus which supplies ink to a recording head by application of pressurized air produced by an air pressurization pump, the ink cartridge comprising:

an outer shell member constructed at least by a first outer shell constituent member and a second outer shell constituent member that are hermetically coupled together;

an ink pack of flexible material storing ink therein, the ink pack being housed within the outer shell member; and

a pressure chamber defined between the outer shell member and the ink pack and adapted to receive the pressurized air produced by the air pressurization pump, wherein reinforcement ribs are formed on surfaces of the first and second outer shell constituent members, the surfaces at least partially defining the pressure chamber.

6. (Previously Presented) The ink cartridge according to claim 54, wherein the first outer shell constituent member and the second outer shell constituent member are hermetically coupled together by heat-welding.

7. (Original) The ink cartridge according to claim 6, wherein a continuous, substantially planar weld surface is formed over the entirety of a peripheral edge of a lower case forming the first outer shell constituent member, and a heat-welding film forming the second outer shell constituent member is thermally welded to the weld surface.

8. (Original) The ink cartridge according to claim 7, further comprising a reinforcement member which covers an outside of the heat-welding film.

9. (Original) The ink cartridge according to claim 8, wherein an engagement section removably engaging the peripheral edge of the lower case is formed integrally on a peripheral edge of the reinforcement member.

10. (Original) The ink cartridge according to any one of claims 6 through 9, wherein reinforcement ribs are formed on the surface of the first outer shell constituent member, the surface at least partially defining the pressure chamber.

11. (Previously Presented) The ink cartridge according to claim 54, wherein a first continuous, closely contactable surface is formed over the entirety of a peripheral edge of a lower case forming the first outer shell constituent member; a second closely contactable surface is formed on a peripheral edge of a cover forming the second outer shell constituent member to be brought into close contact with the first closely contactable surface; and an engagement section removably engaging the peripheral edge of the lower case is formed integrally on the cover, the engagement section maintaining the case and the cover in a sealed state.

12. (Currently Amended) An ink cartridge constructed so as to supply ink to a recording head by receiving pressurized air produced by an air pressurization pump, comprising:

- an outer shell member;
- an ink pack of flexible material storing ink therein, the ink pack being housed in the outer shell member;
- a pressure chamber defined between the outer shell member and the ink pack, and adapted to receive the pressurized air produced by the air pressurization pump;
- a pressurized air inlet port provided to the outer shell member, wherein the pressurized air supplied from the air pressurization pump is introduced to the pressurized air inlet port; and
- an ink outlet section which is provided to the ink pack, and which enables outflow of ink from the ink pack; wherein:
 - when the ink cartridge is installed in a recording apparatus and used for a printing operation, the ink cartridge pressure chamber is sealed from the atmosphere; and

when the ink cartridge is removed from the recording apparatus, the pressurized air inlet port is released, to thereby bring the pressure chamber in communication with the atmosphere, and the ink outlet section is brought into a closed state.

13. (Original) The ink cartridge as defined in claim 12, wherein the pressurized air inlet port is formed integrally with the outer shell member, and includes a cylindrical member which defines an air channel communicating with the pressure chamber.

14. (Original) The ink cartridge as defined in claim 12, wherein the ink outlet section has a valve member, wherein, when the ink cartridge is mounted a recording apparatus, the valve member comes into contact with a connection section of the recording apparatus and recedes in an axial direction, thus becoming open; and wherein, when the ink cartridge is removed from the recording apparatus, the valve member advances in the axial direction, thus sustaining a closed state.

15. (Original) The ink cartridge as defined in claim 14, wherein the ink outlet section has a spring member for urging the valve member so as to advance in the axial direction.

16. (Currently Amended) The ink cartridge as defined in any one of claims 12 13 through 15, wherein the ink outlet section is exposed to the outside of the outer shell member by way of an opening section formed in the outer shell member, wherein an O-ring is interposed between

the opening section and the ink outlet section, and wherein an engagement member is provided for establishing a sealed state between the opening section and the ink outlet section by pressing the O-ring.

17. (Previously Presented) An ink cartridge for use with a recording apparatus, including an ink pack of flexible material storing ink therein, and a cartridge case formed for housing the ink pack, wherein, when the ink cartridge is mounted to the recording apparatus, pressurized air is introduced into the cartridge case, the ink cartridge comprising:

first and second cases which constitute the cartridge case, said second case having a circumferential portion;

a flange section formed along an edge of an opening of the first case, wherein said circumferential portion of said second case covers said flange section; and

at least one lug-shaped member which is formed on the second case and engages with the flange section, thereby coupling the first and second cases together, wherein said lug-shaped member protrudes inward from an inner surface of said circumferential portion.

18. (Original) The ink cartridge according to claim 17, wherein, after the ink pack is housed in the first case, the edge of the opening of the case is sealed by a film member, thereby realizing a sealed state, and wherein the second case functions as a cover for preventing expansion of the film member when the film member receives the pressurized air.

19. (Original) The ink cartridge according to claim 17, wherein a tapered surface and an engagement step section are formed on the lug-shaped member such that, when the second case is attached to the first case, the flange section is relatively guided by and along the tapered surface to engage with the engagement step section.

20. (Original) The ink cartridge according to claim 17, wherein the second case is formed from a planar section acting as a cover and a fold section formed integral with and perpendicular to the planar section, and the lug-shaped member is formed on an interior surface of the fold section.

21. (Original) The ink cartridge according to claim 20, wherein a plurality of independent lug-shaped members are intermittently formed on the interior surface of the fold section.

22. (Original) The ink cartridge according to claim 21, wherein slit holes are formed through the planar section of the second case to correspond in location to the plurality of independent lug-shaped members, and to be elongated along the fold section.

23. (Previously Presented) The ink cartridge according to any one of claims 18 through 22, wherein the film member is sealed to the edge of the opening of the first case by heat welding.

24-42 (Cancelled).

43. (Previously Presented) An ink cartridge for use with a recording apparatus, including an ink pack of flexible material storing ink therein, and a cartridge case formed for housing the ink pack, wherein, when the ink cartridge is mounted to the recording apparatus, pressurized air is introduced into the cartridge case, the ink cartridge comprising:

first and second cases which constitute the cartridge case, said second case is formed from a planar section acting as a cover and a fold section formed integral with and perpendicular to the planar section;

at least one lug-shaped member which is formed on the fold section of the second case;

and

at least one slit formed through the second case at a location corresponding to the location of the lug-shaped member, said slit extending in a direction parallel to the fold section.

44. (Cancelled)

45. (Previously Presented) The ink cartridge according to claim 1, further comprising an ink supply port of the ink pack and an air inlet port disposed on a surface of the first outer shell constituent member,

wherein the opening over which the film is hermetically sealed is formed in a surface of the first outer shell constituent member different from the surface of the first outer shell constituent member where an ink supply port of the ink pack and an air inlet port are disposed.

46. (Previously Presented) The ink cartridge as defined in claim 12, further comprising a sealing member interposed between the ink outlet section and the outer shell in a radial direction of the ink outlet section.

47. (Previously Presented) An ink cartridge for use with a recording apparatus which supplies ink to a recording head by application of pressurized air produced by an air pressurization pump, the ink cartridge comprising:

an outer shell member constructed at least by a case and a heat-welding film;

an ink pack of flexible material storing ink therein, the ink pack being housed within the outer shell; and

a pressure chamber defined between the outer shell member and the ink pack and adapted to receive the pressurized air produced by the air pressurization pump.

48. (Previously Presented) The ink cartridge according to claim 47, wherein the case and the heat-welding film are hermetically sealed together by heat-welding.

49. (Previously Presented) The ink cartridge according to claim 48, wherein a continuous, substantially planar weld surface is formed over the entirety of a peripheral edge of the case, and said heat-welding film is thermally welded to the weld surface.

50. (Previously Presented) The ink cartridge according to claim 49, further comprising a reinforcement member which covers an outside of the heat-welding film.

51. (Previously Presented) The ink cartridge according to claim 50, wherein an engagement section removably engaging the peripheral edge of the case is formed integrally on a peripheral edge of the reinforcement member.

52. (Previously Presented) The ink cartridge according to any one of claims 48 through 51, wherein reinforcement ribs are formed on the surface of the case, the surface at least partially defining the pressure chamber.

53. (Previously Presented) The ink cartridge according to claim 47, further comprising a cover coupled to the case to cover said film, wherein an engagement section removably engaging a peripheral edge of the case is formed integrally on the cover.

54. (Previously Presented) An ink cartridge for use with a recording apparatus which supplies ink to a recording head by application of pressurized air produced by an air pressurization pump, the ink cartridge comprising:

an outer shell member constructed at least by a first outer shell constituent member and a second outer shell constituent member that are coupled together so that said second outer shell constituent member is laid over an opening formed in a first surface of the first outer shell constituent member;

an ink pack of flexible material storing ink therein, the ink pack being housed within the outer shell;

an ink supply port of the ink pack and an air inlet port, which are disposed on a second surface of the first constituent member, the second surface being different from the first surface; and

a pressure chamber defined between the outer shell member and the ink pack and adapted to receive the pressurized air produced by the air pressurization pump.

55. (Previously Presented) The ink cartridge according to claim 54, further comprising a film hermetically sealed over said opening formed in said first surface of said first outer shell constituent member; wherein said ink pack is housed within a cavity formed by said first outer shell constituent member and said film.

56. (Previously Presented) The ink cartridge as defined in claim 54, wherein said air inlet port is formed integrally with said first constituent member, and comprises a cylindrical member which defines an air channel communicating with said pressure chamber.

57. (Previously Presented) The ink cartridge as defined in claim 54, wherein:

the ink supply port comprises a valve member;

when the ink cartridge is mounted in a recording apparatus, the valve member comes into contact with a connection section of the recording apparatus and recedes in an axial direction, thus becoming open; and

when the ink cartridge is removed from the recording apparatus, the valve member advances in the axial direction, thus sustaining a closed state.

58. (Previously Presented) The ink cartridge as defined in claim 57, wherein the ink supply port further comprises a spring member for urging said valve member in the advancing axial direction.

59. (Previously Presented) The ink cartridge as defined in claim 54, wherein:

the ink supply port comprises an outlet section exposed to the outside of the outer shell member by way of an opening section formed in the outer shell member;

an O-ring is interposed between the opening section and the ink outlet section; and

an engagement member is provided for establishing a sealed state between the opening section and the ink outlet section by pressing the O-ring.

60. (Previously Presented) The ink cartridge as defined in claim 54, wherein the ink supply port further comprises an outlet section and a sealing member, said sealing member interposed between the ink outlet section and the outer shell in a radial direction of the ink outlet section.

61. (Previously Presented) The ink cartridge according to claim 54, wherein:
said first outer shell constituent member further comprises a flange section formed along a periphery of said opening;
said second outer shell constituent member further comprises a lug-shaped member protruding inward from an inner surface of said second outer shell constituent member; said flange section and said lug shaped member engage with each other and couple said first outer shell constituent member and said second outer shell constituent member together.

62. (Previously Presented) The ink cartridge according to claim 54, further comprising:
a film member, wherein:
said film member seals said ink pack between said film member and said first outer shell constituent member in said opening of said first outer shell constituent member; and

said second outer shell constituent member functions as a cover for preventing expansion of the film member when the film member receives the pressurized air.

63. (Previously Presented) The ink cartridge according to claim 61, wherein:
said lug-shaped member comprises a tapered surface and an engagement step section; and
when said second outer shell constituent member is attached to said first outer shell constituent member, said flange section is relatively guided by and along said tapered surface to engage with said engagement step section.

64. (Previously Presented) The ink cartridge according to claim 61, wherein:
said second outer shell constituent member comprises a generally planar section acting as a cover and a fold section formed integrally with, and generally perpendicular to, said planar section; and
said inner surface of said second outer shell constituent member corresponds to an interior surface of said fold section.

65. (Previously Presented) The ink cartridge according to claim 64, wherein a plurality of independent lug-shaped members are intermittently formed on said interior surface of said fold section.

66. (Previously Presented) The ink cartridge according to claim 64, wherein:

a slit hole is formed through said planar section of said second outer shell constituent member to correspond in location to said lug-shaped member; and
said slit hole has a long axis along said fold section.

67. (Previously Presented) The ink cartridge according to claim 62, wherein said film member is sealed to an edge of said opening of said first outer shell constituent member by heat welding.

68. (Previously Presented) The ink cartridge according to claim 54, wherein said outer shell member is generally of a rectangular receptacle-like shape.

69. (Currently Amended) The ink cartridge according to claim 54, wherein said first outer shell constituent member is generally of a concave shape, formed by a side wall walls and a bottom wall.

70. (Previously Presented) The ink cartridge according to claim 69, wherein reinforcement ribs are formed to protrude from an inner side of said bottom wall.

71. (Previously Presented) The ink cartridge according to claim 70, wherein said reinforcement ribs formed on an inner side of said bottom wall are formed in a grid-like pattern.

72. (Currently Amended) The ink cartridge according to claim 69, wherein a first side wall of said side wall-walls is arranged at an angle greater than perpendicular from said bottom surface, such that, in plan view, said opening is of a larger area than said bottom surface.

73. (Previously Presented) The ink cartridge according to claim 69, wherein:

a proximal end of said side wall mates to said bottom surface;

a distal end of said side wall defines said opening; and

an upright flange section and continuous weld surface are arranged on a distal end of said side wall so as to form a perimeter of said opening.

74. (Previously Presented) The ink cartridge according to claim 71, wherein said reinforcement ribs vary in height relative to said bottom surface.

75. (Previously Presented) The ink cartridge according to claim 74, wherein said reinforcement ribs are taller at peripheral regions of said bottom surface than in other portions of said bottom surface.

76. (Previously Presented) The ink cartridge according to claim 54, wherein said second outer shell constituent member is generally of a planar shape.

77. (Previously Presented) The ink cartridge according to claim 76, wherein reinforcement ribs are formed to protrude from an inner side of said second outer shell constituent member.

78. (Previously Presented) The ink cartridge according to claim 77, wherein said reinforcement ribs formed on an inner side of said second outer shell constituent member are formed in a grid-like pattern.

79. (Previously Presented) The ink cartridge according to claim 54, wherein said second outer shell constituent member comprises a director arranged along a periphery thereof.

80. (Previously Presented) The ink cartridge according to claim 73, wherein:
said second outer shell constituent member comprises a director arranged along a periphery thereof; and
said director corresponds to said upright flange section and continuous weld surface.

81. (Previously Presented) The ink cartridge according to claim 80, wherein a tip face of said director is melted together with a portion of said weld surface, to thereby connect said first outer shell constituent member and said second outer shell constituent member.

82. (Previously Presented) The ink cartridge according to claim 54, wherein said ink pack is formed of two sheets of resilient film bonded together along peripheral edges thereof.

83. (Previously Presented) The ink cartridge according to claim 82, wherein said resilient film is a polyethylene film.

84. (Currently Amended) The ink cartridge according to claim 54 82, wherein said bonding of said sheets of resilient film comprises melting by heat welding.

85. (Previously Presented) The ink cartridge according to claim 82, wherein said ink supply port of ink pack is provided at said bonded periphery of said ink pack.

86. (Previously Presented) The ink cartridge according to claim 54, wherein said ink pack is covered by a metal foil.

87. (Currently Amended) The ink cartridge according to claim 54, further comprising a positioning opening hole, wherein:

said opening position positioning opening hole corresponds to a columnar positioning pin arranged on a connection mechanism of said recording apparatus; and

said columnar positioning pin enters said positioning opening hole when said ink cartridge is loaded into said recording apparatus, and helps position said ink cartridge in said recording apparatus.

88. (Previously Presented) The ink cartridge according to claim 54, wherein:

 said first outer shell constituent member is coupled to said second outer shell constituent member along outer peripheral edges thereof; and

 said coupling is provided by an arcuate contact surface arranged to extend along said peripheral edge of said first outer shell constituent member interfacing with an arcuate mating contact surface arranged to extend along said peripheral edge of said second outer shell constituent member.

89. (Previously Presented) The ink cartridge according to claim 54, wherein said ink supply port comprises:

 an annular packing member arranged at a distal end thereof;

 an axially movable valve member arranged axially inside of said annular packing member, wherein:

 said axially movable valve member controls the supply of ink to said recording apparatus.

90. (Previously Presented) The ink cartridge according to claim 54, further comprising a circuit board, said circuit board comprising a data means for storing data.

91. (Previously Presented) The ink cartridge according to claim 90, wherein said data means stores data indicating the amount of ink remaining.

92. (Previously Presented) The ink cartridge according to claim 90, wherein said data means stores data indicating the type of ink stored.

93. (Previously Presented) The ink cartridge according to claim 90, wherein said data means stores data indicating the serial number of the ink cartridge.

94. (Previously Presented) The ink cartridge according to claim 90, wherein said data means stores data indicating the expiration date of the ink cartridge.

95. (Previously Presented) The ink cartridge according to claim 54, further comprising a press member arranged between said first outer shell constituent member and said second outer shell constituent member.

96. (Previously Presented) The ink cartridge according to claim 95, wherein said press member is generally ring-shaped with a window shaped opening in the center thereof.

97. (Previously Presented) The ink cartridge according to claim 95, wherein the surfaces of said press member facing said first outer shell constituent member are tapered.

98. (Previously Presented) The ink cartridge according to claim 72, wherein outer reinforcement ribs are formed on outer surfaces of said side walls.

99. (Previously Presented) The ink cartridge according to claim 75, wherein a protruberance is formed on said taller portion of said rib, said protruberance engaging an outer periphery of said ink pack to hold said ink pack in place in said outer shell member.

100. (Previously Presented) The ink cartridge according to claim 75, wherein a protrusion is formed on said taller portion of said rib, said protrusion engaging with a through hole on an outer periphery of said ink pack to hold said ink pack in place in said outer shell member.

101. (Currently Amended) The ink cartridge according to claim 72, wherein a protruberance is formed on a peripheral edge of an inner side of ~~one of said first side surfaces wall~~, said protruberance engaging an outer periphery of said ink pack to hold said ink pack in place in said outer shell member.

102. (Currently Amended) The ink cartridge according to claim 72, wherein a protrusion is formed on a peripheral edge of an inner side of ~~one of said first side surfaces wall~~, said

protrusion engaging with a through hole on an outer periphery of said ink pack to hold said ink pack in place in said outer shell member.

103. (Previously Presented) An ink cartridge having a pressure chamber which is hermetically sealed from an atmosphere and receives a pressurized air when the ink cartridge is mounted onto a recording apparatus and used for a printing operation, the ink cartridge comprising:

an outer shell member;

an ink pack storing ink therein, the ink pack being housed in the outer shell member to define the pressure chamber between the ink pack and the outer shell member;

an ink outlet section which is provided to the ink pack so that ink in the ink pack can flow out from the ink outlet section, and which is hermetically coupled to the outer shell member; and

a pressurized air inlet port sealable to put the pressure chamber into a hermetically sealed state from the atmosphere;

wherein the pressurized air inlet port is accessible in a direction in which the ink outlet section is accessible, and relatively positioned with respect to the ink outlet section to put the pressure chamber into a communication state with the atmosphere when the ink outlet section is closed.

104. (Previously Presented) The ink cartridge according to claim 103, further comprising:

a pair of positioning holes provided to the outer shell member and accessible in the direction in which the ink outlet section is accessible, wherein the positioning holes are positioned opposite from each other with respect to the ink outlet section.

105. (Previously Presented) The ink cartridge according to claim 103, further comprising:
a data storage unit provided to the outer shell member and accessible in the direction in which the ink outlet section is accessible, wherein the data storage unit is positioned opposite from the pressurized air inlet port with respect to the ink outlet section.

106. (Previously Presented) The ink cartridge according to claim 103, wherein the outer shell member includes a case member containing the ink pack, a lid member coupled to the case member and a film hermetically sealing an opening of the case member and being interposed between the case member and the lid member.

107. (Previously Presented) The ink cartridge according to claim 106, further comprising:
a press member provided within the pressure chamber and disposed between the film and the ink pack.

108. (Previously Presented) The ink cartridge according to claim 1, further comprising:
a press member disposed between the film and the ink pack.

109. (Previously Presented) The ink cartridge according to claim 47, further comprising:
a press member disposed between the film and the ink pack.

110. (Previously Presented) The ink cartridge according to claim 95, further comprising:
a film hermetically sealing the opening of the first outer shell constituent member,
wherein the press member is disposed between the film and the ink pack.

111. (Previously Presented) The ink cartridge according to claim 54, wherein the air inlet
port is accessible in a direction in which the ink supply port is accessible.

112. (Previously Presented) The ink cartridge according to claim 111, wherein the air
inlet port is relatively positioned with respect to the ink supply port to put the pressure chamber
into a communication state with an atmosphere when the ink supply port is closed.

113. (Previously Presented) The ink cartridge according to claim 112, further comprising:
a pair of positioning holes provided to the outer shell member and accessible in the
direction in which the ink supply port is accessible, wherein the positioning holes are positioned
opposite from each other with respect to the ink supply port.

114. (Previously Presented) The ink cartridge according to claim 113, further comprising:

a data storage unit provided to the outer shell member and accessible in the direction in which the ink supply port is accessible, wherein the data storage unit is positioned opposite from the air inlet port with respect to the ink supply port.